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MS APPEAL BRIEF - PATENTS
Docket No.: 3430-0105P
(PATENT)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:
Jeongmin MOON

Application No.: 09/589,881

Confirmation No.: 1734

Filed: June 9, 2000

Art Unit: 2871

For: REFLECTIVE LIQUID CRYSTAL DISPLAY
DEVICE HAVING AN AUXILIARY LIGHT
SOURCE DEVICE WITH A UNIFORM LIGHT
DISTRIBUTION

Examiner: H. NGUYEN

APPEAL BRIEF TRANSMITTAL FORM

MS Appeal Brief - Patents
Commissioner for Patents
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Sir:

Transmitted herewith is an Appeal Brief on behalf of the Appellants in connection with the above-identified application.

The enclosed document is being transmitted via the Certificate of Mailing provisions of 37 C.F.R. § 1.8.

A Notice of Appeal was filed on February 4, 2005.

Applicant claims small entity status in accordance with 37 C.F.R. § 1.27.

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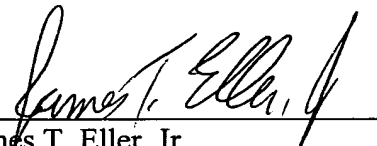
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Dated: June 1, 2005

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Appl. No. 09/589,881
Appeal Brief filed on June 1, 2005

APPEAL BRIEF - PATENTS
PATENT
3430-0105P

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of	Before the Board of Appeals
Jeongmin MOON	Appeal No.:
Appl. No.: 09/589,881	Group: 2871
Filed: June 9, 2000	Examiner: H. NGUYEN
Conf.: 1734	
For:	REFLECTIVE LIQUID CRYSTAL DISPLAY DEVICE HAVING AN AUXILIARY LIGHT SOURCE DEVICE

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010857, Frames 490-492. No further assignments of this application have been made.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals and interferences for this application.

III. STATUS OF CLAIMS

Claims 1-4, 6-11, 14-21, 23 and 24 are all rejected and are being appealed. Claims 5, 12, 13 and 22 have been cancelled.

IV. STATUS OF AMENDMENTS

The Amendment filed on December 23, 2004 was not entered as raising new issues, according to the Advisory Action dated January 13, 2005.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The present invention relates to an auxiliary light source used with a reflective liquid crystal display device. As shown in Figure 4, a light source 503 having a lamp reflector 505 directs light into one side of a light directing member 501. The sidewalls, except for the side near the light source has a sidewall reflector 521. Entering light reflects off the various walls of the light directing member. The lower surface 509 contains a plurality of convex portions. When light strikes a side of one of the convex portions, it becomes directed

downwardly substantially perpendicular to the reflector 507. Figure 5 shows an enlarged view of the convex portions. Angles 523 are in the range of 0° to 10° and accordingly the angle between surfaces 515 or 517 and surface 513 is between 90° and 100° . The distance between adjacent convex portions become smaller as the convex portions are more distant from the light source.

Claim 1 describes the auxiliary light source for the liquid crystal display as comprising a light source 503, and a light directing member 501 which directs incident light toward the reflector outwardly along an orthogonal direction (note the light ray arrow in the center of Figure 4 directed toward the reflector 507 from the third convex portion from the left). The lower surface 509 has a plurality of convex portions 511 extending therefrom with a substantially planar surface which is parallel to the lower surface with an angle of about 90° (page 6, lines 50-14).

Independent claim 10 describes a reflective liquid crystal display device which has a display panel including two substrates spaced apart with liquid crystal sandwiched between the two substrates (unnumbered but shown immediately above

reflector 507 in Figure 4) and a reflector 507. The auxiliary light source device includes a light source 503 and a light directing member 521 having convex portions as described above in regard to claim 1.

Independent claim 11 describes an auxiliary light source having an upper reflective surface 502, a lower reflecting surface 509 and a plurality of convex portions 511 extending toward the reflector to direct light from the light source to the reflector outwardly along an orthogonal direction and an entry surface (unnumbered but adjacent the light source 503) through which light from the light source enters, each convex portion having a planar portion 511 and sides 515, 517, the angle 523 between the lower surface and the sides being about 90° .

Independent claim 21 describes an auxiliary light source device for a reflective liquid crystal display device having a reflector 507 comprising a light source 503 which admits light along the length of the reflector and a light directing device 501 located above the reflector and adjacent to the light source to direct light from the light source to the reflector outwardly along an orthogonal direction (see the arrow in Figure 4 which

extends downwardly from the convex portion toward the reflector 507). The light distribution is substantially uniform along the length of the reflector (page 6, line 14). A plurality of portions extend toward the reflector at 90° angles so that light reflected outwardly is uniform and the spacing between the portions decreases along the length of the reflector with increasing distance from the light source (Figure 4; page 6, lines 16-18).

Dependent claim 2 further describes a light reflecting member 505.

Claim 3 describes the spacing between the convex portions as seen in Figure 4 and described on page 6, lines 14-18.

Claims 4, 9, 20 and 23 relate to the dimensions of the convex portions where the spacing between the convex portions is described in the paragraph bridging pages 6 and 7 of the Specification.

Claims 6-8, and 15-17 relate to the shape of the convex portions that are shown in three different embodiments of Figure 6a, 6b and 6c.

Claims 14 and 24 describe the planar portions 511 of the convex portions as being parallel to the lower reflective surface 513.

Claim 18 and 19 discuss the spacing of the convex portions as described on page 6, lines 14-20.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-4, 6-11, 14-21, 23 and 24 are rejected under 35 U.S.C. § 102(e) as being anticipated by Shinji et al. (U.S. Patent 6,259,854).

Claim 10 is rejected under 35 U.S.C. § 102(b) as being anticipated by Funamoto et al. (EP 08 878 720).

VII. ARGUMENT

Rejection of Claims 1-4, 6-9, 11, 14-21, 23 and 24 as being anticipated by Shinji et al. (U.S. Patent 6,259,854)

Claim 1

The Shinji et al. reference shows a light source 1, a light guide 3 and a reflector 4. The light guide 3 has trapezoidal protruding portions extending from the bottom surface toward the reflector.

Claim 1 states that the light directing member directs the light from the light source toward the reflector outwardly along an orthogonal direction. Also, the lower surface of the light directing member has convex portions with an angle between the lower surface and the surface connecting the planar surface of about 90° when the light reflected along the orthogonal direction is uniform.

Applicants agree that the Shinji et al. reference does show a light source and a light directing member with the light directing member having a lower surface with a plurality of convex portions. However, Applicants submit that the reference does not anticipate claim 1. First, the claim requires that the angle between the lower surface and the surface connecting the planar surface of the convex portion to be about 90° . This angle is seen in Figure 3 as angle θ_a or θ_b . When this angle is about 90° , the convex portions approach a rectangular shape. This claim also describes that the light reflected along the orthogonal direction is uniform.

The Shinji et al. reference shows that this angle can be varied over a wide range. Figures 5-11 show charts of the reflection efficiency for the angle $\delta=0-40^\circ$. This angle is the

complement of the angle described in the claim so that the angle δ should be near 0° when the claimed angle is 90° . Figures 5 and 6 show the angle δ can be either 0° or 2° . Applicants agree that having angle δ be 0° or 2° is equivalent to the claimed angle being about 90° . However, the claim requires that for angles in this range the light reflected along an orthogonal direction is uniform. The Shinji et al. reference teaches against this situation. Column 7, lines 5-7, state "When the pattern is rectangular (Fig. 5, $\delta = 0^\circ$) or when the trapezoid slope angle is small (Fig. 6, $\delta = 2^\circ$), the scattering reflection efficiency $\eta < 1$ and is bad even when $H/W \geq 0.6$ ". Thus, even if the reference teaches that the angle can be that of the claim, it does not teach that the light is uniform when this angle occurs.

The claim also states that the light directing member directs an incident light toward the reflector outwardly along an orthogonal direction. This is shown in Figure 4, where the arrow in the center extends directly downwardly from the lower surface 509 to the reflector 507. The Examiner has attempted to show how a light ray could be outwardly bent along an orthogonal direction if it is directed at the correct angle. The Examiner modified Figure 4 of the patent to show a light beam striking

surface C at a more acute angle than light ray L4 in order to cause the light to be deflected directly downwardly. First, it is pointed out that this example was a suggestion of the Examiner only and is not in any way disclosed or suggested by the Shinji et al. reference. Applicants submit that the reference does not show this feature.

The question then becomes whether this suggested light ray could inherently be present. Applicants submit that it is not even a possible situation. At the top of Figure 4, there is a diagram showing five light beams at different angles. Next to the five arrows is a designation $\theta_c = 47.8^\circ$. This is a reference to column 6, line 46 where the critical angle of the light guide is given as 47.8° . The critical angle of any device is the angle at which light would be internally reflected rather than passing through the boundary. Accordingly, if any light beam strikes the surface CD at an angle greater than 47.8° , it will not be defracted downwardly as suggested by the Examiner, but would be reflected internally. This same figure shows light beams L1, L2 and L3 being reflected in this manner from surface BC. The Examiner has not indicated what the angle between the suggested light beam and surface CD is. However, it appears to

be more acute than the angle between light ray L1 and surface BC. Accordingly, the Examiner's suggestion that this light beam would be deflected straight downwardly toward the reflector is incorrect since it would instead be reflected internally.

Furthermore, the Examiner has not indicated how he arrived at this specific angle to form a downwardly reflected light beam. It is assumed that the Examiner is indicating that if the angle is acute enough to the surface CD, it would deflect in this direction. Because of the critical angle, this is not true. The Examiner has not shown any calculations for showing the angle. In view of the fact that the reference does not describe this situation, Applicants submit that the Examiner should be required to show why he thinks this particular angle will produce a light which is deflected downwardly and also why this angle should be less than the critical angle.

Furthermore, the five arrows described above next to the critical angle value in Figure 4, indicate the rays which enter from the incident edge AD (column 6, lines 45). The Examiner is suggesting a light ray which is substantially more vertical than the five light rays shown. Thus, Applicants submit that the Examiner is going beyond what is seen in the reference and that

such an angle would not be permitted. Applicants submit that the Shinji et al. reference does not teach the light directing member which directs light to a reflector outwardly along an orthogonal direction, as is presently claimed.

Thus, Applicants submit that claim 1 is not anticipated by Shinji et al. and that Shinji et al. does not show light directed outwardly at an orthogonal direction and also does not show the claimed angle being about 90° with a uniform reflective light.

Claim 11

Claim 11 is another independent claim which includes many of the same limitations as claim 1. In particular, this claim also describes the claimed angles being 90° and the reflected light as being uniform in the same fashion as claim 1. The claim also describes the lower reflective surface directing light to the reflector outwardly along an orthogonal direction.

Accordingly, Applicants submit that claim 11 is not anticipated by Shinji et al. for the same reasons recited in claim 1 above regarding these two features.

Claim 21

Claim 21 is another independent claim which also includes the two features discussed above in regard to claim 1, namely that the light is directed toward the reflector outwardly along an orthogonal direction and also that the angle is 90° and the light reflected is uniform. Accordingly, Applicants submit that claim 21 is likewise not anticipated by the Shinji et al. reference for the same reasons.

Dependent Claims

Claims 2-9 depend from claim 1, claims 14-20 depend from claim 11, and claims 23 and 24 depend from claim 21. Each of these claims is considered to be allowable based on its dependency from the corresponding allowable independent claim. These claims further show other features such as the various sizes and spacings for the convex portions and their shapes.

Rejection of Claim 10 under 35 U.S.C. § 102

As anticipated by Funamoto et al. (EP 0 887 8720)

The Examiner specifically refers to Figure 10 as described on page 8, lines 53 to page 9, line 35, of Funamoto et al. The Examiner points out that this reference shows a display panel

102, reflector 103 and auxiliary light source 2 and a light directing member 11. The Examiner also states that the angle is about 90° and the light reflected along an orthogonal direction to the display panel is uniform. The Examiner also points out that the display panel is between the light source and the light reflecting member.

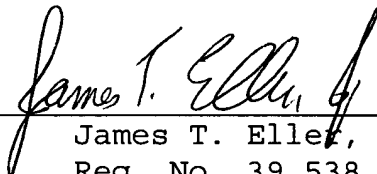
Applicants submit that the Funamoto et al. reference does not teach the present claimed invention. In particular, it is noted that the display panel is described in the claim as including two substrates, liquid crystal sandwiched between the two substrates and a reflector. Thus, the reflector is one part of the display panel. Applicants submit that this is different from the arrangement of the reference where the reflector 103 is disposed under the liquid crystal display panel 102. Thus, in the present invention, the reflector is actually formed in the panel while in the reference, it is separate from the panel. Thus, in the claimed invention the reflector is included in the display panel while in the reference the reflector is a separate part and not included in the display panel. In view of this, Applicants submit that Funamoto et al. does not anticipate the present invention as presented in claim 10.

VIII. SUMMARY

In view of the above, Applicants submit that the final rejection by the Examiner is incorrect. Accordingly, Applicants request that the Examiner be reversed and that the application be allowed.


If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge any payment or credit any overpayment to Deposit Account No. 02-2448. This authorization applies to any additional fees required under 37 CFR §1.16 and 37 CFR §1.17 and in particular to fees for an extension of time.

Respectfully submitted,
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Appendix: CLAIMS APPENDIX
EVIDENCE APPENDIX
PAGE RELATED PROCEEDINGS APPENDIX

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CLAIMS APPENDIX

1. An auxiliary light source device for a reflective liquid crystal display device having a reflector, the auxiliary light source device comprising:

a light source; and

a light directing member for directing incident light from the light source toward the reflector outwardly along an orthogonal direction, the light directing member including,

a lower surface having a plurality of convex portions extending from the lower surface, each of the convex portions having a substantially planar surface which is substantially parallel to the lower surface, and an angle between the lower surface and a surface connecting the planar surface of the convex portion is about 90° , wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform.

2. The device according to claim 1, further comprising:

a light reflecting member to guide light from the light source into the light directing member.

3. The device according to claim 1, wherein a spacing between the convex portions decreases with increasing distance from the light source.

4. The device according to claim 3, wherein the spacing between adjacent convex portions of the lower surface of the light directing member is in a range of 10 μ m to 1000 μ m.

5. (Cancelled).

6. The device according to claim 1, wherein the planar surface of each convex portion has a substantially circular shape.

7. The device according to claim 1, wherein the planar surface of each convex portion has a rectangular shape.

8. The device according to claim 1, wherein the plane surface of the plurality of convex portions has a bar shape extending perpendicular to a direction of light propagation in the light directing member.

9. The device according to claim 1, wherein a distance between the lower surface and the planar surface of the each convex portion is less than 50 μ m.

10. A reflective liquid crystal display device, comprising:

a display panel including two substrates spaced apart, liquid crystal sandwiched between the two substrates, and a reflector to reflect light through the liquid crystal;

an auxiliary light source device for supplying light to the display panel, including,

a light source,

a light directing member for directing incident light from the light source toward the display panel, the directing member having a lower surface having a plurality of convex portions, each having a substantially planar surface which is substantially parallel to the lower surface, an angle between the lower surface and a surface connecting the planar surface of the convex portion being about 90°, wherein light reflected along an orthogonal direction to the display panel is uniform; and

a light reflecting member which guides light from the light source into the light directing member, said display panel being between said auxiliary light source and said light reflecting member.

11. An auxiliary light source device for a reflective liquid crystal display device having a reflector, the auxiliary light source device comprising:

an upper reflective surface to reflect impinging light above a certain incidence angle;

a lower reflective surface having a plurality of convex portions extending toward the reflector to direct light from the auxiliary light source device to the reflector outwardly along an orthogonal direction; and

an entry surface connecting the upper and lower reflective surfaces through which light from a light source enters, wherein each convex portion includes a planar portion and sides connecting the planar portion with the lower reflective surface, and an angle between the lower surface and the sides is about 90°, wherein light reflected along an orthogonal direction to the liquid crystal display device is uniform.

12. Cancelled.

13. Cancelled.

14. The device according to claim 11, wherein the planar portion is substantially parallel to the lower reflective surface.

15. The device according to claim 11, wherein a cross section of each convex portion is substantially circular.

16. The device according to claim 11, wherein a cross section of each convex portion is rectangular.

17. The device according to claim 11, wherein each convex portion extends along substantially an entire width of the reflective liquid crystal display device.

18. The device according to claim 11, wherein the plurality of convex portions are spaced along the lower surface to ensure a uniform distribution of light along a length of the device.

19. The device according to claim 18, wherein the plurality of convex portions are spaced closer together with increasing distance from the entry surface.

20. The device according to claim 19, wherein a spacing between adjacent convex portions is in a range of $10\mu\text{m}$ to $1000\mu\text{m}$.

21. An auxiliary light source device for a reflective liquid crystal display device having a reflector, the auxiliary light source device comprising:

a light source extending along a width of the reflector, to emit light along a length of the reflector; and

a light directing device located above the reflector and adjacent to the light source to direct light from the light source to the reflector outwardly along an orthogonal direction such that a light distribution of light directed by the light

directing device is substantially uniform along the length of the reflector, and such that the directed light is substantially perpendicular to the reflector, and the light directing device includes a plurality of portions extending toward the reflector at a 90° angle such that the light reflected outwardly along an orthogonal direction to the liquid crystal display device is uniform, a spacing between the portions decreasing along the length of the reflector with increasing distance from the light source.

22. Cancelled.

23. The device according to claim 21, wherein the spacing between adjacent portions is in a range of 10 μ m to 1000 μ m and a width of each portion is less than 100 μ m.

24. The device according to claim 21, wherein each of the plurality of portions includes a planar surface parallel to a lower surface of the light directing device and connected to the lower surface by at least one side oriented substantially perpendicular to the lower surface.

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EVIDENCE APPENDIX

None.

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RELATED PROCEEDINGS APPENDIX

None.